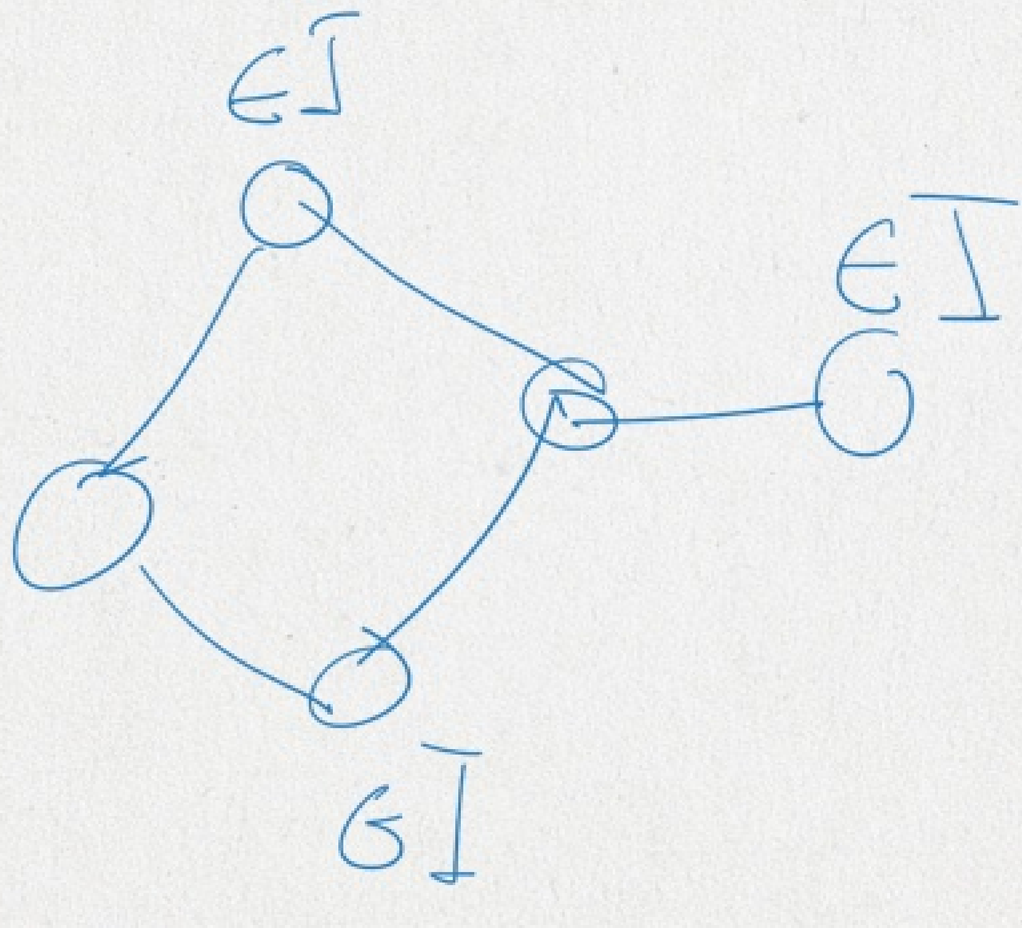
$I \subseteq V(G)$ is an ind. set

if there is no edge between any pair of vertices of I



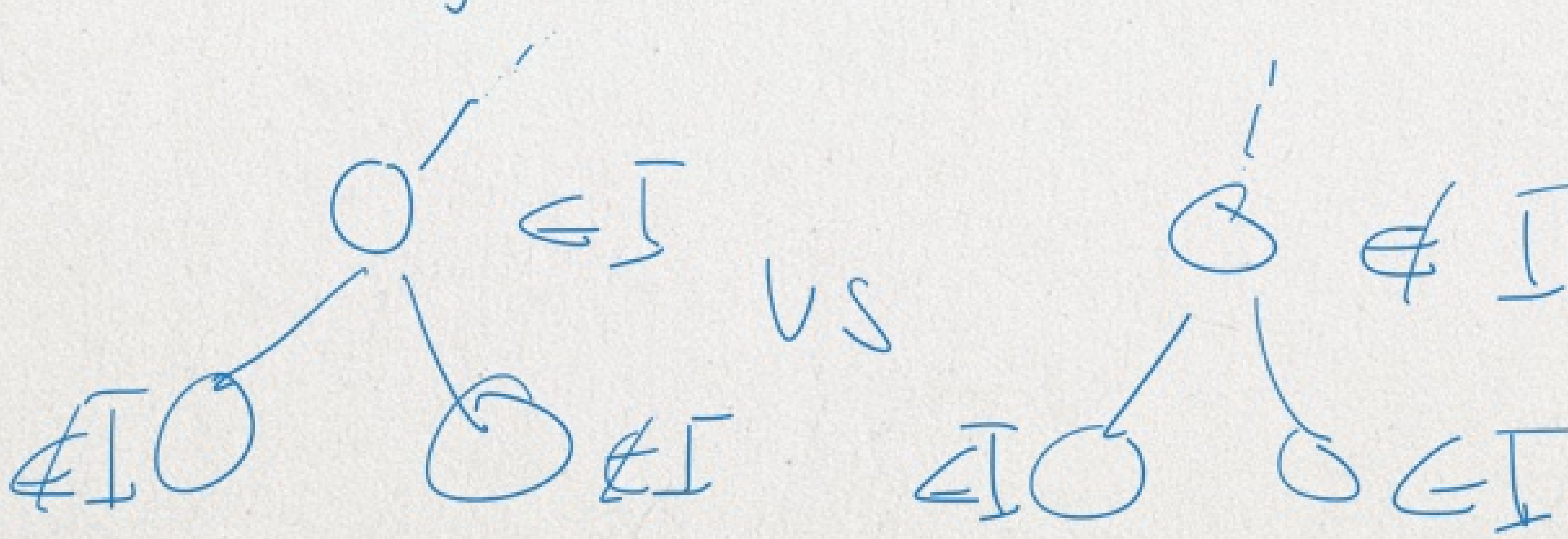
Maximum independent set

Input: graph G

Output: ind. set $I \subseteq V(G)$ of maximum size

NP-comp. etc.

Easy for trees because including a leaf in I is always better than including its parent.



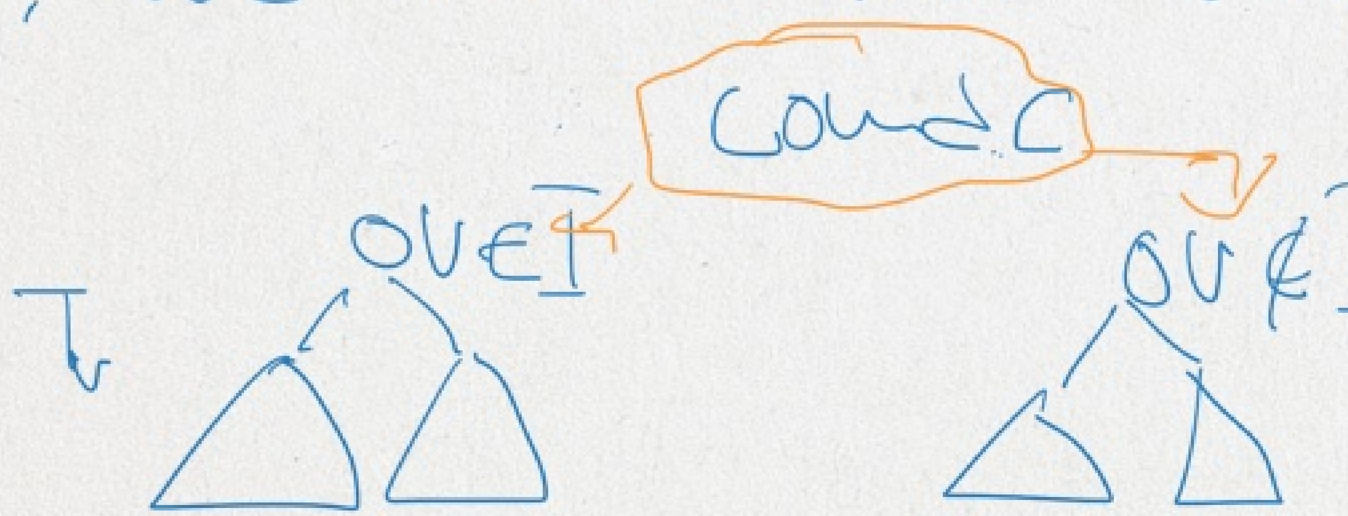
Max weight ind. set

Input: G and $\alpha: V(G) \to R$

Output: ind. set I maximizing

$$\alpha(I) = \sum_{v \in I} \alpha(I)$$

DP alg: For each vertex v, we have two subprob.

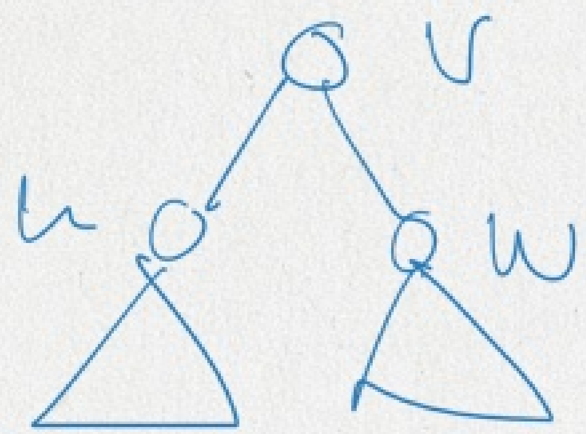


The subsolution is max $\alpha(I)$ where I is an ind. set in T_v sat. C

Subsolutions for leaves

- $\ell \in I$ solution $s(\ell, in) = \alpha(\ell)$
- $\ell \notin I$ — " — $s(\ell, out) = 0$

subsolution from solutions of smaller problems

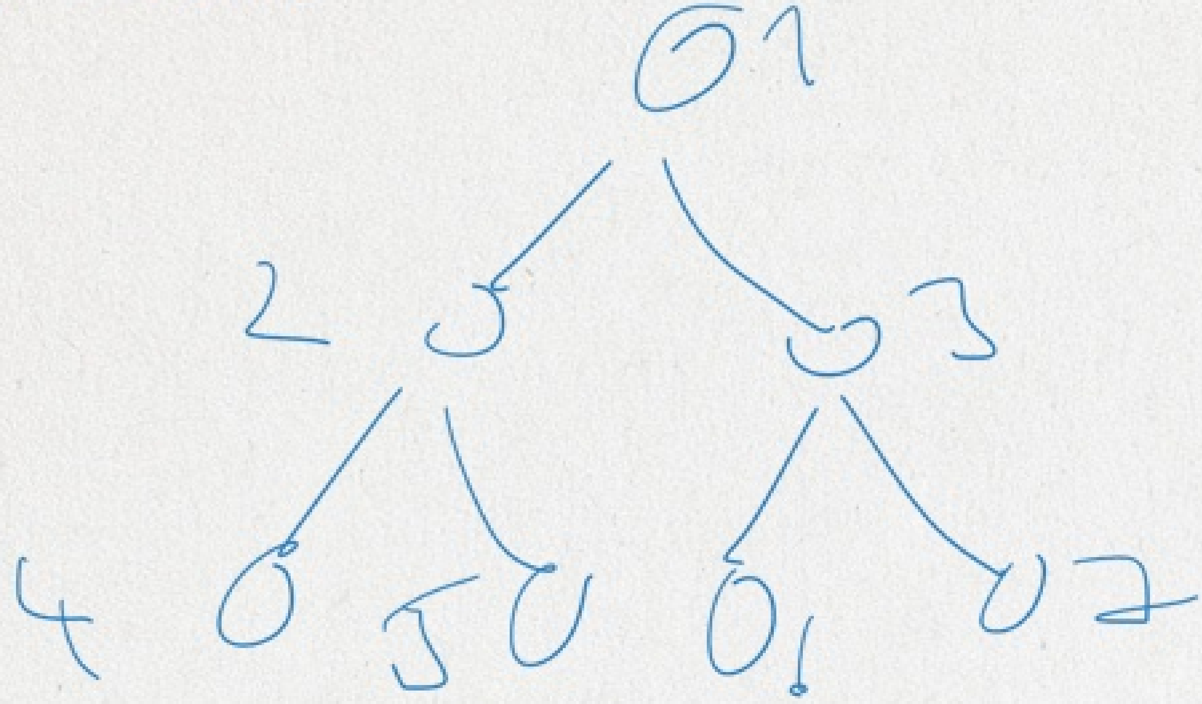


$v \in I$ solution $s(v, in) = s(u, out) + s(w, out)$

$v \notin I$ solution $s(v, out) =$

$$\max_{a,b \in \{in, out\}} \left[s(u, a) + s(w, b) \right]$$

We enumerate v in order of $|V(T_v)|$.



vertex	1	2	3	4	5	6	7
α	15	14	2	5	4	8	9
in	29	14	2	5	4	8	9
out	31	7	17	0	0	0	0